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subscription price for each fascicle (M. 1.50=35c) makes this one of the cheapest, as it promises to be one of the best, botanical works ever published. It strikes us as unfortunate, however, that the fascicles should be separately paged.

NOTES AND NEWS.

DR. STERNBERG has gone to Rio de Janeiro to investigate yellow fever.

MENYANTHES TRIFOLIATA turns up in Rhode Island this year with trimerous and tetramerous flowers in one raceme.

THE YEARLY increase of cork is said by Gerber to vary from one row of cells in Salix to one hundred rows in Quercus suber.

HARDWICKE'S *Science Gossip* for May has a very interesting description of Australian forests by the editor, Dr. J. E. Taylor.

MANY new and interesting species are being discovered in the Philippine Islands by Dr. Sebastian Vidal, Director of the Botanic Garden at Manila.

THE catalogue of Rhode Island plants, by Mr. James L. Bennett, is to be published by the Providence Franklin Society, and is understood to be in press.

DR. THEOBALD SMITH, of the Bureau of Animal Industry, Washington, D. C., has just closed a course of six lectures on bacteria before Cornell University.

THE May number of *The Microscope* contains "Staining and mounting plant sections," by C. Wellington, and "The movement of diatoms," by Cornelius Onderdonk.

THE CHEMICAL relations of bacteria is the title of a long and interesting article by Dr. Charles E. Fairman, of Lyndonville, N. Y., printed in the *Medical Register* (Phila.) of April 27.

DR. MANLY MILES has an article in *Agricultural Science* for May on the microbes of nitrification, based upon cultures and experiments which he has been prosecuting for some time.

PROF. BESSEY, in the *American Naturalist* for April, has done a capital thing for botanical students in publishing a list of the best and most accessible manuals in the various groups of plants.

THE Linnean Society has recently elected the following foreign members: Dr. George A. Schweinfurth, Cairo, Egypt; Count H. Solms-Laubach, University of Göttingen; Dr. Melchior Treub, Buitenzorg, Java.

THE SPECIES of Peronosporæ found in Scotland, are enumerated by Dr. J. W. H. Trail in the *Scottish Naturalist* for April. The list gives 1 Pythium, 3 Cystopus, 1 Phytophthora, and 24 Peronospora, being eleven less than the United States' list, published by Dr. Farlow in this Journal, 1884-5.

A HAND-BOOK of the other orders of vascular cryptogams, by Mr. J. G. Baker, is announced in continuation of Hooker & Baker's "Synopsis Filicum." It will include Equisetaceæ, Lycopodiaceæ, Selaginellaceæ and Rhizocarpeæ, in which there are eleven genera and about seven hundred species.

THE FOLLOWING corrections should be made on page 101 of this volume: line 2, for "Tamisonato" read "Temisonata"; line 4, for "form" read "from"; line 8 from bottom, place a semicolon after "probable" and dele the comma after "likely."

A DOZEN years ago Vogel and Reischauer observed yellow crystals covering the outer coatings of walnuts, a substance found also in the expressed juice, and called by them nucine or juglon. And now Bernthsen and Semper have just built it up artificially—another instance of the synthesis of a natural product.

PROF. W. W. BAILEY writes that a lady pupil had brought him a spray of an apple-tree with peculiarly monstrous flowers. The petals were aborted and green, and there were no stamens. The carpels, with style and stigma, were fairly well developed. The tree is reported to bear fruit from these curious flowers.

A COURSE of botanical lectures by Rev. F. D. Kelsey, illustrated with crayon drawings by F. W. Anderson, has just been given before the high school at Helena, Montana, and is to be repeated during June before the College of Montana at Deer Lodge. This is the first instruction of the kind given in the territory.

AT THE celebration of the seventieth birthday (March 30) of Professor C. von Naegeli, a present was made him of a basket filled with seventy different fruits, ornamented with seventy kinds of flowers, and surrounded by a garland composed of seventy plants, which belonged to as many different genera and species.

A BIBLIOGRAPHY of articles relating to North American fungi, by Drs Farlow and Trelease, is begun in the *Harvard University Bulletin* for May. It includes 338 numbers, and extends to and includes the first entry under H. A more extended notice of this important work will be given when the complete work is received.

THERE IS REASON to believe, according to Van Tieghem, that the forming branches of roots do not merely push aside the tissues of the main root, but actually absorb the cell-contents, and finally the cell-walls of these overlying tissues. We should expect some such action to accompany the mechanical pressure from the analogy in animal tissues.

A NEW Aroid, *Hydrosome Leopoldiana*, is described and figured by Dr. Masters, in *Gardener's Chronicle*, May 14. It is from the Congo country and has a remarkable spathe and spadix ("astonishing rather than beautiful," as Dr. Masters puts it). The very much divided leaves are three feet across and spread horizontally from a petiole two feet in length.

IN THE *American Garden* for May, Prof. L. H. Bailey, Jr., has defined for horticulturists six terms which are often confounded in their literature. The terms are acclimation, acclimatization, naturalization, domestication, hardiness and winter-killing. He also correctly remarks that "good English, considerably employed, is requisite to great advancement in horticultural literature.

A REALLY instructive teratological note in the *Bulletin* of the Botanical Society, of France, details the finding of specimens of *Caltha palustris* having two extra sepals within the usual ones which bore a row or two of apparent buds on their edges. M. Mangin investigated the structure of these buds and found that each possessed the structure of a perfect ovule, even to the egg-apparatus and antipodal cells!

PROF. HUXLEY recently read a paper before the Linnean Society on "The Gentians; Notes and Queries." He divides the Gentianæ into two great series, characterized by the disposition of nectarial organs and a gradation of forms of the corolla from deeply-cleft rotate to funnel-form. The two series are called Perimelitæ and Mesomelitæ. He also considered their evolution and geographical distribution.

MR. J. KRUTTSCHNITT's persistent assertion that the fecundation of the ovule by pollen tubes entering it was a myth has at last had attention in Europe, where Guignard, who has made himself famous by his investigation of fertilization, has studied Mr. Kruttschnitt's chief reliance, the genus *Cereus*. He finds fertilization, as was to be expected, accomplished in the usual way, through in *C. tortuosus* the pollen tubes may be as much as three weeks in reaching the ovules.

THE *Bulletin of the Torrey Botanical Club* for May contains "Notes on the American species of *Marsilia*," by L. M. Underwood and O. F. Cook. Five species are described: *M. polycarpa* Hook. & Grev., West Indies and South America; *M. quadrifolia* L., Connecticut, and cultivated elsewhere; *M. macropoda* Eng., Texas and New Mexico; *M. uncinata* A. Braun, Louisiana and Texas; *M. vestita* Hook. & Grev., widely distributed throughout the west, and extending into Mexico.

NOW COMES A. Meyer and denies *in toto* the Nägelian theory of the composition of the starch grain, viz: that it consists of two substances, granulose and starch-cellulose intermixed. He concludes from his researches that in ordinary starch, which turns blue with the iodine test, there is but one substance, and that it is alike throughout, the layered appearances being due to the varying porosity. Starch which turns red with the iodine test has other materials mixed with the true "starch-substance."

MR. DOUGLAS H. CAMPBELL has just completed his studies in the laboratory of Strasburger, and is now under Pfeffer at Tübingen. As a result of his work at Bonn, he has published in the *Bot. Gesellschaft* (March, 1877) a paper "On the development of spermatozoids." It is accompanied by a plate illustrating the subject in such groups as *Gymnogramme*, *Alsophila*, *Adiantum*, *Pellia*, *Sphagnum*, *Salvinia*. The results were obtained in the use of the very complete fixing and staining reagents in use by Dr. Strasburger, and which lie at the basis of so many of his astonishing results.

THE JOURNAL of the Royal Microscopical Society for April contains a valuable summary of the various contrivances, known as warm and cold stages, for keeping organisms at a given temperature while being studied under the microscope. The article is thoroughly illustrated and will be very helpful to any who wish to know what is the best thing to have in this line. Dr. Dallinger's thermostatic stage for the continuous observation of septic organisms is a most ingenious affair, without which the patient studies he has made on the life histories of these organisms would have been impossible.

DR. BYRON D. HALSTED has just issued a bulletin of the Iowa Agricultural College, showing the work done in the botanical department. It is one of the best we have ever seen, and represents an amount of good work done by the professor and his students that is really surprising. Part I. gives the result of work with the students. Some of the subjects reported on are as follows: Effects of drought upon grasses; Weeds on a square rod of ground; Largest and smallest leaves (*Tilia* and *Picea nigra*); Largest tree (white elm); Five worst weeds (*Xanthium*

strumarium, *Ambrosia artemisiæfolia*, *Portulaca oleracea*, *Setaria glauca*, and *Bidens frondosa*); Pigment cells of bloodroot; Young prothallus of *Equisetum*; a Study of pollen, etc. Part II. contains observations and experiments, treating of such subjects as germination of ergot from the wild rye, germination in red clover and timothy, is the cup-plant insectivorous?, observations on common thistle, pumpkin pegs, notes upon the *Peronosporæ* for 1886, and several other groups of fungi, the "cedar apples," the *Erysiphei*, etc. This represents a very partial list of the subjects treated, and it will be inferred that the bulletin must represent the work of a very busy year.

MR. GEORGE E. DAVENPORT, of Medford, Mass., has just sent us a photograph of a complete set of *Ophioglossaceæ* for the United States, which he had put up for the Middlesex Institute. The specimens are shown just as they lie on the sheet, with diagrammatic notes and names. With a hand lens they may be studied in the photograph with a completeness only second to examining the specimens themselves. The photograph would be a very valuable thing to slip in among the *Ophioglossaceæ* of a herbarium to represent a type set. Mr. Davenport informs us that he can furnish copies to botanists for 35 cents.

DR. H. MOLISCH proposes¹ the following new test for sugar in plant sections: "A not too thin section laid on a slide is treated with a drop of 15-20 per cent. alcoholic solution of α naphthol; then two or three drops of concentrated H_2SO_4 are added. If the section contains sugar the violet coloration appears in less than two minutes. In other carbohydrates the color appears in a quarter to half an hour. In practice two sections are used; one of these is boiled for a few minutes in water, whereby sugar, dextrin, gum and glucosides are dissolved. The two sections are then submitted to the same test, and if sugar is present in the unboiled section, the coloration immediately appears. As dextrin, gum and glucosides may be usually disregarded, the appearance of the violet staining indicates, with great probability, the presence of sugar. The foregoing test may be used to demonstrate the presence of inulin, which, by Sachs' method, is liable to be confounded with sphæro-crystals, for these become immediately stained deep violet with α naphthol and sulphuric acid, and on the addition of thymol, are dissolved with the production of a red color."

MR. GEORGE MASSEE calls attention in the April number of the *Journal* of the Royal Microscopical Society, to the well-marked differentiation of a tissue for mechanical support in the stems and pileus of various species of *Polyporus*. It is especially striking in *P. Pisochapani* in the stem of which it forms a central hollow cylinder, composed of thick-walled hyphæ, eseptate and often polygonal in section. "At the apex of the stem this tube widens out into a funnel shaped body which becomes broken up into a number of ribs, radiating from the central portion to the margin of the pileus." The hyphæ of the other parts of the plant are very thin-walled and septate. There seemed to be no connection between the two sorts. "No member of the *Agaricini*, so far as I have been able to ascertain, shows such a marked division of labor amongst its component hyphæ for purposes of support." Mr. Massee also refers to the well-known laticiferous vessels of *Lactarius* and *Russula*, which contain glycogen and other substances. He affirms that the cystidia of the

¹ Sitzung-berichte der Königl. Akad. Wissen. Wien xciii (1886) pp. 912-23; fide Jour. Roy. Mic. Soc. April, 1887.

gill-bearing fungi are simply the terminal cells of laticiferous vessels, but can suggest no function for them unless the pouring out of their contents is for furnishing food to the developing spores, which, in many species, are bathed with it during growth.

THE FOLLOWING notice from Prof. W. W. Bailey in a Providence (R. I.) paper finds such an extensive application among botanists that we give it for their benefit. His experiences have evidently been the common ones of the fraternity, but his spirited rejoinder is not so common:

The writer esteems it a privilege, as he implied last summer, to answer any inquiries of a botanical nature which are within the range of his study. This always provided that the trusting public will thoughtfully remit the stamp or stamped envelope for the reply.

The announcement before made has resulted in an extensive correspondence, profitable we hope on both sides; we mean profitable in the sense of knowledge given or received. A teacher's work, especially in science, does not stop with the lecture-room. He is, or should be, the servant of the people, helping when he can, and owning up to ignorance when his knowledge fails him. It is from this diffidence only that we ever avoid an offered occupation.

It will aid very much in the work of the writer—save him, indeed from labor which it is sinful to thrust upon him—if people will only attend to the few following directions:

I. Collect plants both in flower and fruit, if possible. If herbaceous, take root and all, or, if too large, representative portions of root, stem, leaves, etc. Bend the plant into a Z or N, if necessary. Pare down the roots if too thick.

II. Do not snip off the tip end of a plant, even in flower, and send the cluster. Often a botanist can name such a fragment, but it is unfair to ask him. Moreover, it imperils his soul.

III. Tell by whom and where the plant was collected. A specimen unlocalized is worth next to nothing. It deserves to go into the waste-basket with poems on spring. The old curator has an underground railway for running such trash into the ash-heap.

IV. Don't think because a plant was collected at the tomb of Burns, or grew out of the rudder-hole of Noah's ark, that its botanical interest is at all enhanced. A good, well-collected plant from St. Helena is no better because it grew in the paths of Longwood. Sentiment is wholly apart from our special work. We often indulge it, but always with a Spanish rein.

V. Send the plants well pressed. Do not wrap them up in a wad, as if they were to be fired from a cannon.

VI. Trustingly believe that the writer, who here offers his service without price, is not so ferocious as his articles above denote.